Farthing

A Minimum Voyaging Yacht for One Revised 12/10/2012

By Tom MacNaughton

A small voyaging yacht, designed to go anywhere yet inexpensive enough for anyone to build, Farthing is an intriguing concept. It took root in my mind and resulted in this design. The name Farthing is from a very small British coin.

Such a craft satisfies the urge so many have for traveling the world; yet she'd make an excellent all weather coastal cruiser. She's shoal enough for you to hop over the side and push off if she runs aground. You could haul her on a simple cradle drawn up the beach by block and tackle; or careen her anywhere in the world which had at least three feet of tide. No maintenance would be beyond her owner's capabilities so no yard bills need be paid.

They say a corked bottle can weather any storm at sea because of its great strength relative to its size. Farthing has the same sort of strength and some builders have even fitted her with full foam flotation. She's about as safe as you can make a small vessel. Aside from getting run down by a freighter or piling her up on the rocks in a bad storm it should be pretty hard to get in much trouble.

Farthing's displacement is about minimum for a boat to cross oceans without undue hardship. Though a heavy boat, judged by her displacement to length ratio, Farthing is not very heavy for her size range. For this minimal size and weight heavy displacement is least expensive per pound, easiest handling for one person, and provides the most comfortable motion. This may require explanation.

Many have heard light displacement boats cost less than heavy ones. But this means, given two boats of the same length, if one is substantially lighter than the other is it will cost less. The relationship between weight and cost isn't direct, however. Halving the weight does not half the cost. The light boat will cost more per pound, because many of the building steps will take the same time for either boat. So a longer boat of the same weight as Farthing would be more expensive.

Ease of handling and comfortable motion, are relative terms. Nevertheless, it can be generalized that heavy boats are less subject to wild behavior at sea than light ones. I go into this in more detail below. The old rule of thumb, that increasing weight for a given water plane area (area of a horizontal section cut through the boat at the LWL) slows the motion, applies to Farthing.

If you want to learn the maximum amount about seaworthiness in offshore yachts, we recommend that you read Seaworthiness – The Forgotten Factor by C.A. Marchaj. You'll find a review in the publishing section of the www.macnaughtongroup.com web site.

Many would favor a longer boat of the same weight in hopes of more speed potential. It isn't that simple. In many years of living aboard, talking to other voyagers, and researching, I have found there is a limitation on the practical speeds for light displacement voyaging craft.

Light displacement boats tend to surf on the face of the waves. This might be fine for a large crew with a fresh helmsperson all the time. But, for single handed, or shorthanded, voyaging yachts, relying on wind vanes (or tired crew) to steer, surfing isn't a good thing. When boats start to surf, they often shoot forward fast enough to dramatically change the amount and direction of the relative wind. Since it is relative wind that operates windvane steerers, the vessel runs wild. Often sail must be shortened far more on light displacement boats than heavy ones to maintain control. Heavy boats, which do not surf much, thus seem to average higher speeds at sea. This is true except in quite large craft. Older light displacement types, not designed to lift in the water at high speeds, have less of this tendency.

Farthing will be fast at sea under a variety of conditions. Her great stability, combined with the extreme ease of reefing and unreeling the Chinese lug rig, allows carrying the ideal amount of sail at any given time. This produces maximum speed.

Farthing can cruise two coastwise acceptably if not comfortably. We've met a couple (with cat) on an eighteen footer with a good deal less interior space than Farthing. Aboard over a year, they seemed quite happy. So it

certainly can be done. Nevertheless we see Farthing as primarily a single person boat. Perhaps if more than one person wants to cruise Farthing they should build a fleet!

For two you might be better off choosing our 22' Shilling design which has standing headroom, two cabins, and can be built for about three and one half times the cost of a Farthing.

It's interesting to compare Farthing with Willing Griffin, the smallest boat ever to complete the OSTAR. The two boats weigh about the same fully loaded. Nineteen foot Willing Griffin has less interior room than fifteen foot Farthing. Willing Griffin has a very large cockpit and low sides.

She became totally submerged several times. Farthing has no cockpit to fill with water and lots of reserve buoyancy in her high flush deck topsides. This is not to say that she might not become totally submerged by a breaking sea occasionally as well. Willing Griffin was not laid out to be handled from a central position; and indeed required a good deal of foredeck work, because her skipper could not afford the headsail reefing gear he wanted. Farthing's rig could be built complete for a material cost less than the cost of a rugged reliable headsail furling system for Willing Griffin; and Farthing's rig can be handled entirely from inside the closed bubble topped hatch.

I believe the design process largely determines whether a vessel will be a happy ship. Farthing is such a ship. She is very simple and strong; a boat whose maintenance and ability at sea would never worry you. A boat with simple, purposeful beauty, she is capable of many adventures, large or small, which would give a great sense of accomplishment to her skipper. Whether you did anything daring or not, she would earn admiration and respect in whatever port you called.

Lines

Waterlines are fine forward and full aft to reduce pitching. She meets the voyager's five prime requirements for sailing ability. She would be fast in light airs because of the low wetted surface which is a product of the shorter girth measurements of heavy displacement forms. She'd be reliable in heavy weather downwind due to ease of handling and avoidance of surfing. This allows carrying on longer at higher speeds without loss of control, as described above. She'd work to windward well in heavy weather or a chop, because of her large sail area, great form and ballast stability, and her pitch dampening waterlines. She also has comfortable motion because of the above mentioned pitch dampening, a moderate relationship between beam and draft, and her weight in relationship to her waterplane area. Finally she'd have willingness to self-steer ensured by her long keel, and simple, built on self steering gear.

The lines show a small triangle of transom immersed. Some may say this would produce extra drag; but by the time water flowing around the hull reaches this point it will be turbulent enough so no measurable increase will occur. On the other hand, immersing this bit of the transom allows better overall lines in the aft third of the vessel, producing a gain in speed.

Farthing has a finer more weatherly hull form than many famous ocean voyaging types. It's also interesting that 2'8" (her maximum draft) is less than the three feet that is about as close to the surface as coral heads grow. Thus the coral reefs of many favorite areas of ocean voyagers would prove less worrying to Farthing. She could bounce over most of them unscathed. Though I hope no one would be so foolish as to go looking for reefs to sail over.

In early 1998 after a couple of decades experience with this series of designs and after previously modifying the Shilling lines slightly we slightly altered Farthing's lines. This will have little effect on sailing performance. It slightly reduces the draft to the stated figure but this is insignificant. It also slightly increases the interior space. The major change was to slightly increase the maximum beam on the waterline and slightly reduce the draft. The reason to do this was simply that we found that at anchor in crowded harbors with motorboat traffic the boat would roll more than we felt we felt it would with some minor shape changes. Since it appeared possible to improve upon this with no loss in other desirable characteristics we modified the lines a bit. The improvement will be very slight.

Rig & Deck Gear

The profile shows a Chinese lug rig using battens of equal length. This rig is easy to reef, unreef, and furl from one location, without going on deck. Further, it is extremely inexpensive, with its solid wood spar, line, a few small blocks, the sail, and battens. There are no winches, stainless rigging, tangs, or chainplates. The sail is cut flat;

getting its shape from battens and sheetlets. This means it's a cinch for the amateur sailmaker as it requires no special knowledge. These days we have found that Composite Engineering www.composite-eng.com can produce a carbon fiber spar and yard for Farthing less expensively than most builders can produce wood spars. So for professionally built boats this is probably the way to go. Right now Covey Island Boatworks www.coveyisland.com is building a Farthing for a West Coast client. As I write this the hull is just getting started but we've all had a great time discussing everything, and we're all very enthused about the project.

Covey Island Boatworks will be recognized by most people interested in modern wood and epoxy construction these days. Great boats come out of their shop all the time and we are quite pleased to have them building one of our favorite designs.

For many years I felt I had to suggest that the Chinese rig would not be quite as good to windward as an average Marconi rig. Despite this our clients who have built these Coin Collection boats, including Farthing, have insisted for years that they were beating the pants off comparable boats both off the wind and to windward. For a long time I could not figure why this would be true and would point out that many stock boats were inadequately rigged to keep prices down and that some Marconi rigs had been so adversely affected by racing rules to have become quite inefficient.

However recent studies by such aero-hyrodynamicists as Dr. Sighard Hoerner and studies conducted and reported in the book Sail Performance by C.A. Marchaj have shown that our theories of efficient foils have been very incomplete. To put this very briefly we have mostly considered two dimensional flow producing "foil lift". However it turns out that in some planforms a major contribution to total lift is made by a different type lift called vortex lift. The conventional Marconi rig is quite poor at vortex lift, whereas the Chinese rig is quite excellent at producing lift this way. So the combination of the two lift methods makes the Chinese rig very efficient to windward indeed. So today both theory and practice now mesh very well and we can say with confidence that the Chinese rig, when designed, set, and handled by those experienced with it can be a truly remarkable performer, just as our clients have been insisting.

Of course with the Farthing being built at Covey Island having a carbon fiber mast her performance should be quite special. Even the solid wood mast is light enough for two people (maybe one person) to step or unstep. Since I completed this design in the late '70s the inevitable few have written in wanting gaff cutter and marconi sloop rigs. I guess the gaff cutter would be possible with a bowsprit and the sacrifice of the wind vane but what would be the point? The boat is better the way it is. A marconi rig could be used effectively on Farthing only with boomkins and bowsprits at extra expense. You would have to stretch the boat lengthwise quite a bit to get proportions reasonable for a marconi inboard rig. Many of my designs can do well under different rigs than they were originally designed for. With some possible exceptions Farthing isn't one of them. While dreaming don't write me notes on how wonderful she would be with an inappropriate rig. Dream only real dreams for her. Built as drawn she will be simple, and simple to handle. A joy to sail. Change her and you risk destroying a harmonious whole.

The visual and mechanical focal point of the deck layout is the control station hatchway; to which all control lines lead. Everything, except anchoring, is directed from right here. All of these functions except celestial navigation can be conducted with the bubble hatch closed.

The toerails actually form handrails along the sides of the deck. Great places for tying fenders, or awnings, etc. The simple trim tab windvane steerer is ideal for this naturally yaw resistant vessel. The course this gear steers is fully adjustable from inside the closed control station hatch.

While lounging on deck in good weather, pieces of light cord are led from the trim tab tiller through tiny blocks on each quarter. One runs up the waterways on each side of the deck and is tied (with plenty of slack) through the forward ends of the toerails. With this arrangement you can steer the boat from anywhere on deck; tacking or gybing at will by pulling one line or the other.

You could sit on the bow getting the anchor ready while sailing your way into the harbor; maneuvering the boat as you wished.

Portlights, or non-opening deadlights, with bronze finishing rings are fitted in the topsides as shown. Additional light and air comes through non-fouling, waterproof Tannoy Ventilites or Vetus UFO ventilators. These are always open, project a bare inch above the deck, and won't let in water even when you throw a bucket full or a wave top

into them. Don't ask me why it works. The ads say the water “forms its own barrier”. I'd put these ventilators on the centerline, one forward of the mast, one between mast and hatch, and one aft over the galley.

Other deck gear includes a ring to clip your safety harness line to before going on deck. Also two fifteen pound CQR plow anchors, each on two hundred feet of seven-sixteenths inch diameter three strand nylon line, are tied down in chocks on the foredeck. Sew chafing gear onto the last few fathoms of these rodes working from the anchor. This protects them from chafing on rock or coral bottom.

The tiller is under the deck where it passes through sheet neoprene into a rudder head mortise. Auxiliary propulsion could be oars; used sitting on a cushion facing aft, with your legs in the hatchway. I'd prefer a single yuloh (lightly curved sculling oar) used over the stern from the hatch or kneeling on deck. Plans for the yuloh are included with the Complete Plans. Oars or yuloh should push her at least 2-1/2 knots. Engines, inboard or outboard, would be overkill except in high current areas. If you really do need an auxiliary I would suggest a Torqueedo electric outboard www.torqueedo.com running off batteries charged by a solar panel.

Interior

The chain locker has a middle partition. One anchor rode leads into each side through hooded chain pipes; which are stoppered by rolling and tying wetsuit neoprene around the rodes and stuffing this plug into the chainpipe while at sea. I'd think mud catching pans beneath grates under the rodes would be a good idea.

Next aft is a double berth with flotation and stowage under. In heavy weather a canvas lee cloth could divide this to prevent rolling about. On each side are book and gear shelves with open bins beneath. The water tanks under the double berth's aft end hold thirty gallons.

Aft of the berth is the control station with adjustable seats on either side. These have back rests to suit. One seat may be folded up out of the way when not in use. The berth’s aft edge forms an armrest forward of the seats. Padded lids on the chart and navigation equipment boxes form another arm rest aft.

These lids form a partial support seat while sitting with your head in the bubble. If the hatch is open, your head and shoulders are above the deck when standing.

Sail handling lines are led inside the hatch through nearly waterproof double fairleads. Line falls are stuffed into canvas envelopes under the deck.

The galley area aft contains a single burner stove. Probably either a backpacker’s multifuel pressure stove or an Origo alcohol stove. The former burns kerosene or mineral spirits as simply and reliably as is possible in a pressure stove. The Origo alcohol stove in non pressurized and essentially fool proof. For this size boat, were it not for the fact that in areas where there are no hardware stores or marine supply stores alcohol of sufficient purity may be hard to find, the Origo would be the first choice. Near the stove a circular recess holds a mug or thermos. Salt and fresh water pumps supply two small plastic wastebaskets set into the counter as deep, wash and rinse sinks. These are dumped overboard when through doing the dishes. On both sides of the galley and in back of it are shelves with lockers under.

The plans holder will not find a head shown as in a vessel this size “bucket-and-chuck-it” is the most practical method of dealing with that problem. Aside from a line parting or plastic cracking their maintenance is zero.

Construction

Farthing is built with a ½” thick strip planked hull and deck covered each side with WEST System™ glass cloth in WEST System™ epoxy resin. The planking provides longitudinal strength and also stiffness. The cloth provides transverse strength using the planking as a core. Bulkheads are tied in but floor timbers are the only other transverse members. Farthing is normally built upside down over the molds. Longitudinal members are set into these, stern framing added, and the stern is then be planked.

I'd plank working from the sheer to the bottom of the keel. This gives a good smooth run of strips in the topsides and seems to have a pretty nice run all the way down to the bottom of the wood keel.

Keel, stem and sternpost are made without a rabbet, because the hull will be sheathed. They are tapered to allow strips to lie smoothly against them. The strips are then run by as necessary while planking. They are cut off flush and shaped to give a rounded stem face before sheathing.

Once the hull has been turned over and placed on the ballast, the molds are removed, the inside is sheathed, floors added, and the basic interior fitted. The deck is built over temporary camber molds, trimmed, turned over, and sheathed on the underside, then put back, glued in place, and sheathed on top. Exterior and interior trim, and the rig are then added.